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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Patterson, Thunte Skaar & Christensen, P.A. 4800 IDS Center 80 South 8th Street Minneapolis, MN 55402-2100			EXAMINER TRIEU, THAI BA	
			ART UNIT 3748	PAPER NUMBER

DATE MAILED: 02/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/643,001

Applicant(s)

MOE, CORDELL R.

Examiner

Thai-Ba Trieu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17-19 is/are allowed.
- 6) ☒ Claim(s) 1,4-7 and 9-14 is/are rejected.
- 7) ☒ Claim(s) 2,3,8,15 and 16 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Specification

IN THE SPECIFICATION:

1. The disclosure is objected to because of the following informalities:

- On page 7, line 1-2, "**compressor end 20**" should be replaced by – **compressor end 20--**.

Appropriate correction is required.

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Specifically, in claim 10, line 1, "**a poppet valve**" is required to be incorporated with the specification.

Claim Objections

Claims 1-3 objected to because of the following informalities:

1. In claim 1:

- Line 5 should be replaced by following:
 - combustion gases from [[within]] the combustion chamber into the expansion chamber; --.
- Line 9, "**a check valve**" should be replaced by -- **a compressor check valve--** (for consistency with the specification).
- Lines 10-11 should be replaced by following:

-- a check valve between [[the compressor]] a compressor chamber and the combustion chamber to control the entry of compressed air from the compressor chamber into the combustion chamber; and--.

2. Claim 2 should be replaced by following:

-- The rotary engine of Claim 1, wherein the pass gate sentry valve comprises a valve shiftable from [[an open]] a closed orientation to [[a closed]] an open orientation and biased toward a closed orientation by a biasing force, and having a portion acted upon by the pressure of combustion gases from the combustion chamber such that when the pressure of combustion gases reaches a predetermined value an opposing force created overcomes the biasing force and the pass gate sentry valve shifts from [[an open]] the closed orientation to [[a closed]] the open orientation thereby permitting the combustion gases to expand into the expansion chamber.--

3. Claim 3 should be replaced by the following:

-- The rotary engine of Claim 1, wherein the pass gate sentry valve comprises a valve shiftable from [[an open]] a closed orientation to [[a closed]] an open orientation and biased toward a closed orientation by a spring, and the pass gate sentry valve further comprising a partially hemispherical valve body engageable to a valve seat and a piston in a cylinder, the cylinder being in fluid

communication with the combustion chamber such that expanding gases from the combustion chamber act upon the piston and overcome the bias of the spring to move the valve body away from the valve seat.--

4. In claim 8, line 3, claim 10, line 1, and claim 11, line 5, ***“the check valve”*** should be replaced by -- **the compressor check valve**-- (for consistency).

5. Claim 15 should be replaced by following:

-- The combustion chamber of Claim 11, wherein the pass gate sentry valve comprises a valve shiftable from [[an]] a closed orientation to a open orientation and biased toward a closed orientation by a biasing force, and having a portion acted upon by the pressure of combustion gases from the combustion chamber such that when the pressure of combustion gases reaches a predetermined level an opposing force created overcomes the biasing force and the pass gate sentry valve shifts from [[an open]] the closed orientation to [[a closed]] the open orientation thereby permitting the combustion gases to expand outwardly from the combustion chamber [[chamber]].--

6. Claim 16 should be replaced by following:

-- The combustion chamber of Claim 11, wherein the pass gate sentry valve comprises a valve shiftable from [[an]] a closed orientation to [[a]] an open orientation and biased toward a closed orientation by a spring, and the pass

gate sentry valve further comprising a partially hemispherical valve body engageable to a valve seat and a piston in a cylinder the cylinder being in fluid communication with the combustion chamber such that expanding gases from the combustion chamber act upon the piston and overcome the bias of the spring to move the valve body away from the valve seat when pressure within the combustion chamber reaches a predetermined level.--

7. In claim 17, lines 12-13, ***“the confines of a combustion chamber”*** should be replaced by -- **the confines of the combustion chamber** --.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5-7, and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Schulz (Patent Number 939,751).

Regarding claim 1, Schulz discloses a rotary engine comprising:

a combustion chamber (23, 24) (See Figures 1 and 3);

an expansion chamber (10) in intermittent communication with the combustion chamber (23, 24) (See Figures 1 and 3);

a rotor (8) disposed within the expansion chamber (10), the rotor being driving by the expansion of the combustion gases from the combustion chamber (23, 24) into the expansion chamber (10) (See Figures 1 and 3);

a compressor operably driven by said rotor (8) to compress atmospheric pressure air (via port 20) and to force the compressed air into the combustion chamber (23, 24) (See Figures 1 and 3);

the combustion chamber (23, 24) (See figures 2 and 3) comprising:

an enclosure (Not numbered) (See Figures 1-4);

a check valve (30, 32) between a compressor chamber (9) and the combustion chamber (23,24) to control the entry of compressed air from the compressor chamber (9) into the combustion chamber (23, 24); and

pass gate sentry valve (29) located between the combustion chamber (23, 24) and the expansion chamber (10) to intermittently permit the exit of expanding combustion gases from the combustion chamber (23, 24) into the expansion chamber (10).

Regarding claims 5-7 and 10, Schulz further discloses:

a spark plug (38, 39) at least partially contained within the enclosure (Not Numbered) (See Figures 1-4);

the compressor being a rotary compressor and coaxially driven by the rotor (8) (See Figures 2 and 3);

the compressor check valve being a poppet valve (30,32) (See Figures 2 and 3).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4 and 9 rejected over Schulz (Patent Number 939,751), in view of Louthan et al. (Patent Number 6,125,813).

Schulz discloses the invention as recited above; however, Schulz fails to disclose a glow plug and a fuel injector,

Louthan teaches that it is conventional in the rotary engine art to utilize a glow plug (70) at least contained within the enclosure; and a fuel injector (74) to inject a metered quantity into the combustion chamber (See Figures 2-5 and 7-8; and Column 4, lines 26-59).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have utilized a glow plug and a fuel injector, as taught by Louthan, since the use thereof would have maintained the temperature be consistent

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with achieving short reaction times for fuel be combusted and injected fuel in the combustion chamber of the Schulz engine.

Claims 4, 9, and 11-14 are rejected over Schulz (Patent Number 939,751), in view of Tomoiu (Patent Number 5237964).

Regarding claims 4 and 9, Schulz discloses the invention as recited above; however, Schulz fails to disclose a glow plug and a fuel injector.

Tomoiu teaches that it is conventional in the rotary engine art to utilize a glow plug (Read as a temperature sensor 36, 36'), and a fuel injector (28, 28') to inject a metered quantity into the combustion chamber.

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have utilized a glow plug and a fuel injector, as taught by Tomoiu, to detect the temperature of and to inject the fuel into the combustion chamber, in the Schulz engine.

Note that the examiner considers a glow plug as a temperature, since the applicants have been alternatively used a glow plug and a temperature sensor (See Page 8, lines 15-17 of the instant application).

Regarding claims 11-14, Schulz discloses a combustion chamber (23, 24) for use with a rotary engine, the combustion chamber (23, 24) (See figures 2 and 3) comprising:

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an enclosure (Not numbered) (See Figures 1-4);

a check valve (30, 32) in a passage to control the entry of compressed air from the compressor chamber (9) into the combustion chamber (23, 24); and

a pass gate sentry valve (29) in a passage to intermittently permit the exit of expanding combustion gases from the combustion chamber (23, 24) into the expansion chamber (10); and

a spark plug (38, 39) at least partially contained within the enclosure (Not Numbered) (See Figures 1-4).

However, Schulz fails to disclose a coolant injector, a glow plug, and a fuel injector.

Tomoiu teaches that it is conventional in the rotary engine art to utilize a coolant injector (30, 30') to inject a metered quantity into the combustion chamber, a glow plug (Read as a temperature sensor 36, 36'), and a fuel injector (28, 28') to inject a metered quantity into the combustion chamber (See Figure 1).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have utilized a coolant injector, a glow plug, and fuel injector, as taught by Tomoiu, to maximize the combustion efficiency, since the use of the coolant injector to inject the liquid coolant into the combustion chamber would have lowered the temperature as well as increased the pressure in the combustion chamber; the use of the glow plug would have detected the peak temperature of the combustion chamber signifying fully developed combustion; and the use of the fuel injector would have

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metered the fuel quantity needed to be injected into the combustion chamber of the Schulz engine.

Allowable Subject Matter

Claims **17-19** are allowed.

Claims **2-3, 8, and 15-16** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance: The prior art fails to disclose or render obvious the claimed combination including:

"coupling the cylinder in fluid communication with the combustion chamber such that expanding gases from the combustion chamber act upon the piston and overcome the biasing force to move the valve body away from the valve seat, when pressure within the combustion chamber reaches a predetermined level thereby opening the pass gate sentry valve and allowing the combustion gases to expand through the aperture beyond the confines of the combustion chamber."

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Lamar (US Patent Number 1,156,697) discloses a rotary engine.
- Jameson et al. (US Patent Number 1,189,115) disclose a rotary internal combustion engine.
- Burke (US Patent Number 2,161,244) discloses an internal combustion chamber.
- Jorgensen (US Patent Number 4,378,764) discloses a piston and combustion chamber with improved fuel circulation.
- Curtis (US Patent Number 1,722,517) discloses an internal combustion engine.
- Czarnocki (US Patent Number 2,688,320) discloses a piston and cylinder construction for internal combustion engine.
- Ferguson et al. (US Patent Number 2,735,416) discloses a piston and cylinder construction for internal combustion engine.
- Waldron (US Patent Number 2,551,073) discloses an injector for an internal combustion engine.
- Slaughter (US Patent Number 4,741,164) discloses a rotary internal combustion engine
- Sugiura (Patent Number JP 58206827 ,A) discloses a shutter valve type rotary engine.


- Walter (Patent Number EP 85427 A1) discloses a four-stroke internal combustion engine.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thai-Ba Trieu whose telephone number is (703) 308-6450. The examiner can normally be reached on Monday - Thursday (6:30-5:00), every Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion can be reached on (703) 308-2623. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9302 for regular communications and (703) 872-9302 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0861.

TTB
February 12, 2004


Thai-Ba Trieu
Patent Examiner
Art Unit 3748